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This certificate is issued in support of an application for Patent registration in a country outside New Zealand pursuant to the Patents Act 1953 and the Regulations thereunder.

I hereby certify that annexed is a true copy of the Provisional Specification as filed on 25 March 2002 with an application for Letters Patent number 517971 made by David Michael King.

Dated 1 April 2003.

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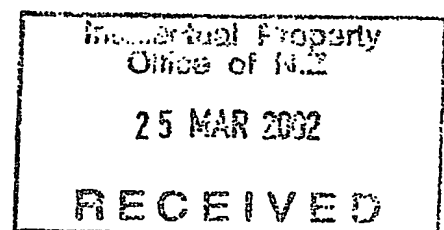
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Patents Act 1953
Provisional Specification.

**'CUSTOMISED INTERACTIVE COMMUNICATIONS AND
ENTERTAINMENT SYSTEM'**

I, David Michael King, of 26 Longford Street, Mt Wellington, Auckland,
New Zealand,

*do hereby declare this invention to be described in the following
statement:*



TITLE CUSTOMISED INTERACTIVE COMMUNICATIONS AND ENTERTAINMENT SYSTEM

FIELD

This invention generally relates to provision of communications between the world and an individual of a variable degree of disability such as advanced age, involving a type of set top
5 box to provide the modality (television, telephone, world-wide web, etc) as desired by the user, noting that specific individuals will vary in their ability to operate controls that cause the set top box to change state, and in particular the invention relates to control apparatus for types of set top box.

10 BACKGROUND

A number of incongruities in society are brought together here as a problem to be solved.

1. Often a programmer or industrial designer creates a product which is not compatible with minority groups, such as left-handed, disabled, or geriatric groups. For example, a videotape player is a challenge in relation to setting up a delayed recording session for
15 example. Many elderly people would like to have a telephone where the number to be dialled can be entered and amended very slowly before the connection is made. Further, hardly any habitual computer user can appreciate the degree of difficulty experienced by a naive user with a personal computer having the usual keyboard, mouse, and an operating system that tries to cope with all possible eventualities rather than be simply
20 helpful.

2. Almost all entertainment equipment (such as CD players) is provided in solid black boxes with poorly visible markings and instructions, hard to see if one's eyesight is less than perfect or if viewed in poorly lit environments.

3. Many people overlook the need of retired, disabled, and geriatric individuals to be properly entertained, to communicate with others, to carry out functions of daily life (such as on-line shopping) especially when in advancing years the ability to cope with technical equipment is diminished. Yet anything that makes use of modern developments to enhance life is beneficial for example in keeping people in their own homes for as long as possible.

4. People in care, such as in retirement homes, are often separated in time and space from friends and relatives yet they would enjoy frequent contact if it was possible. Entertaining a number of residents by placing them in front of a television set for a whole afternoon is not ideal.

At this time, developments in interactive television appear to be usable in the field of the invention, yet few medical literature references exist. A preliminary search of the patent literature has not disclosed any similar inventions, although Microsoft's US 6317885 relating to interactive cable television included some parallels. US 6209025 to Bellamy is an example of technology which could be used when integrating the Internet and telephone services with a set top box and television. Bell Atlantic in US 5790173 describe use of a set top box as a subscriber interface in the "Advanced Intelligent Network". Lucent Technologies (US 6061719) is another way of integrating the Internet and television. None of these address the problem identified by this invention.

We see the problem to be solved as "the provision of an integrated system of communications and entertainment equipment for individual use in a form that is matched with the user's current ability to operate the equipment, so that the user actually can take control".

OBJECT

It is an object of this invention to provide communications and entertainment equipment in an integrated, user-compatible form, or at least to provide the public with a useful choice.

STATEMENT OF INVENTION

In a first broad aspect this invention provides apparatus of the general type known as a "set top box" capable in use of providing at least one communication channel between a display device presented to an individual and a source of information, wherein control of the set top box is provided by means of a customised controlling device (including both apparatus
55 and a set of control instructions), adapted in order to match the ability of the individual to operate the controlling device and gain access to the at least one communication channel especially if the individual has a degree of disability.

In a second broad aspect, a range of customised controlling devices is made available so that by selection of one controlling device from the range an optimised match can be made
60 between the present capability of the individual to operate the device, and the type of operation offered by the device.

In a related aspect, a given controlling device may be provided with a range of software so that the device has conferred upon it a range of capabilities.

Preferably the selected controlling device is, when in use, integrated with the functions of
65 the set top box so that the controlling device assumes control of at least the user aspects of the set top box.

Preferably the controlling device communicates with the set top box by means of a wireless communications channel.

Alternatively the controlling device communicates with the set top box by means of a cable.

70 In a related aspect, the selected controlling device is provided with a set of operational controlling instructions compatible with those used within the set top box, so that (a) the set top box can recognise the type of controlling device in use, and (b) the controlling device can cause a particular set of appropriate commands to be carried out.

In a further related aspect, at least some of the customisation of a controlling device is
75 optionally provided for within the operational controlling instructions, so that optimisation of the match between the user and the controller can be improved.

In a still further aspect, the operational controlling instructions are provided within a memory module built into the controlling device.

In a yet still further aspect, the operational controlling instructions are provided within a
80 memory module supplied along with the controlling device, for connection with the set top box.

In a still further aspect, the operational controlling instructions are provided to the set top

box in a form that may be downloaded into a memory within the set top box through a communications channel.

- 85 In a third broad aspect, the selected controlling device is capable of causing the set top box to cause control-related information to be presented to the individual when the customised controlling device is being used.

Preferably the mode of, and the degree of difficulty of, actuation of the control device are matched to the capability of the individual.

- 90 Preferably the conceptual difficulty of the control information presented is matched to the capability of the individual.

Preferably the format of control information presented is matched to the capability of the individual.

- Optionally the selected controlling device or the set top box in combination is capable of
95 noting the pattern of use over time by the individual and then of offering the same pattern as a first choice on subsequent occasions.

- In a fourth broad aspect, the set top box may be loaded with data relating to the individual which is not likely to change, such as identification numbers, names of relatives, passwords to often visited sites (such as family web sites), so that this individual data is not lost when
100 the selected controlling device is exchanged.

Alternatively a memory card, memory stick, or entry in a host service may be used.

In a fifth broad aspect, the set top box may be loaded with a sequence of instructions comprising a programme of entertainment by an individual. (This may be done by any person)

- 105 In a sixth broad aspect a source of information comprises at least one web site, carrying sets of web pages, each set of web pages being adapted to match at least approximately the conceptual difficulty of one of a range of customised controlling devices

PREFERRED EMBODIMENT

- The description of the invention to be provided herein is given purely by way of example
110 and is not to be taken in any way as limiting the scope or extent of the invention.

DRAWINGS

Fig 1: is a diagram showing the overall layout of the invention, including a range of control units each with a range of software.

Fig 2: is a diagram showing an example control device for a disabled person and a typical screen. (This is one of many specific possibilities).

Fig 3: is a sectional diagram showing a compact version of the invention (with its protective case removed).

In one form as shown in Fig 1, the invention includes three broad sections: (1) a set-top box (STB) or the like for providing control and computing functions, (2) a television set or similar output device, and (3) a range of specific interface hardware of a range of types for controlling the STB, each interface being provided with a corresponding range of displays and instructions. The displays and instructions may appear on the television set or elsewhere. It is likely that most of (1) and all of (2) will comprise existing apparatus, though used in part in novel ways.

Set top boxes are available from a number of sources. For example, National Semiconductor Corporation provides the "Geode" (TM) STB reference platform which is similar to a personal computer motherboard and which supports 80*86 family instructions hence can employ the operating systems Windows and Linux. Linux open-source software groups have formed a group known as "Linux4.TV" that prepares application software and has had three annual competitions by March 2002. The "Geode" includes a plethora of inputs such as USB, IEEE 1284, Infra-red, telephone, Ethernet, Smartcard, and video and audio, and also supports hard-disk storage. This system is designed to accept plug-in software modules.

In Fig 1 we show as 101 a partial list of possible media that may be used as "channels to the world". We assume here that newspapers and the like are represented as news services on the web (CNN, *The Scotsman*, *The Times*, *El Pais*, etc); 102 is a display device, 103 and 104 are earphones and speakers for information carried as speech, 105 is a STB as herein described. The part (3) of the invention is shown here as 106A, 106B and 106C representing an arbitrary range of appropriate physical interfaces (of which one is selected in order to match a given state of competence). Any physical interface may have a variety of control and display software used within (for example) interface 106A although one version may be sufficient. 106B and 106C would most probably use other sets of software. Hence the range of choices of interface can be large, and furthermore can be tailored to a specific person during use by suitable modification of the software. It is particularly useful if all the inter-

faces and all the software share, as far as possible, a common "look and feel" so that a user, when shifting to another interface, finds all aspects are as familiar as possible. At least interfaces close to each other in the range are similar, even if large differences unavoidably exist from one end of the range to the other.

One end of the range would be interfaces (such as personal computers, TV remote controls, and the like) usable by normal, able persons. Mid-range controls would be simplified for easier use by older people (including people finding it rather difficult to continue living at home), and may include a number of smart features to be described later. The other end of the range would comprise a range of usually novel interfaces specifically adapted for low-frustration use by disabled (mentally as well as physically) and aged persons. Loss of memory syndromes and dementias are common sequels of old age; it is desirable to complement these disabilities as far as possible. The effectiveness of any particular control interface from within the range is broadly similar to that of any other - or at least to related controls within the entire range. Possibly the simple-to-use interfaces will not have as much capability as a versatile yet more complex interface. It has always been a challenge to raise functionality yet retain simplicity.

As shown in 101 in Fig 1, the communication channels that could be used with a STB and an interface according to the invention may include:

1. The telephone system, including possible video links. This communications channel also carries text messages, data services, such as E-mail, services (such as TTY) for the deaf, emergency calls, and calls to people having only an ordinary telephone.
2. The Internet (World-wide Web) which may also offer specially adapted pages as part of the total collection. (Usual web pages are too finely detailed for television screen presentation but an increasing amount of WAP-compatible graphics (big letters) is in the right direction. Web pages such as <www.uib.no/isf/guide/geri.htm> list a number of services. Special pages may include pages for on-line shopping, for banking, and medical services including pharmacists, nurses, doctors, and emergency services. The Internet also offers two-way video telephone links for communication between individuals. Families may include movies etc on family web sites (which might have access limited to family members). The Internet may be brought in through the telephone or any other compatible communications channel. Email is also supplied through Internet web sites..
3. Games making use of the audio visual facilities provided by the invention, such as the card game 500, bridge, "Scrabble", "Boggle", chess, and Bingo as well as the set of war and fantasy games.

175 4. Television programme services, whether locally broadcast or acquired via satellite, cable, or other media. Also videotape and DVD disk playbacks. The (optional) hard disk within the STB can store digital television programmes.

5. Radio programme services, whether locally broadcast or acquired via satellite, cable, or other media. Also cassette tape, record, and CD disk music.

180 6. The Internet also includes radio broadcasts from distant places, as well as MPG and similar systems for distribution of music. A number of disabled people are particularly disadvantaged if they are foreign-born and do not speak the language of the country where they live. These broadcasts overcome that.

7. Community broadcasts, local news, etc.

8. Room environment controls (lights, locks, curtains, fans, air conditioning etc)

185 The output of the STB 105 would most probably be passed through a standard television receiver 102 and/or through an audio amplifier to speakers 104 or headphones 103. Concerning the user, and the special aspects of the invention, the invention is capable of being used by a perfectly healthy individual at home, then as he or she ages or perhaps becomes disabled, the control interface is able to be adapted so that the individual can
190 continue to enjoy a familiar environment - although the means of reaching it may have to be altered. Even if the user is moved into an institution, the invention can be brought too, thus retaining the user's links with the world through a familiar medium.

Clearly specific details, such as capabilities and modes of use of the range of specific interfaces themselves is quite open-ended and amenable to a good deal of psychological
195 planning as well as fundamental common sense. Within a specific physical interface, different instruction sets may be written in order to provide further levels of matching of facilities to any one individual user's faculties. As is well known in the art, a variety of modes may be included within one programme and selected on the spot by reading of (for example) a DIP switch mounted on a circuit board of the interface. A caregiver or specialist
200 can then match the interface to the person's needs without having to supply a large variety of physical items.

Any individual may progress down the following list (and may revert to a higher level if recovered) should their faculties become impaired. Some examples are:

EXAMPLE 1

205 The user has all faculties although he or she may be immobile. Keypads (as used in

ordinary remote controls, telephones, cellular telephones), full keyboards, as in personal computer type controls, and palm computer control perhaps with a scribe are applicable. Messages can be created for sending by speech, optionally with a "webcam", by typing, or by writing with the scribe.

210 EXAMPLE 2

Weakened eyesight (strong glasses, cataracts, retinal degeneration, etc) A remote control in which colour is used to identify the parts. (For example large indicia and bright bands of colour). Coloured LEDs on the remote control may flash to acknowledge commands. Any screen messages involved in control are in large fonts and preferably white letters on black or dark blue. Messages can be created for sending by speech, optionally with a "webcam", by typing, or by writing with the scribe.

EXAMPLE 3

Substantially no eyesight. A remote control in which Braille or similar is used to identify the parts. A video output from the set-top box (TV etc) may not be necessary. A text-to-speech device such as a "BaBel Infovox" (TM) converter, to help give the person feedback when controlling the invention, and for many uses such as converting e-mails and Web pages to speech would help to overcome the disability. Messages can be created for sending by speech, optionally with a "webcam", and possibly by typing, or by writing with the scribe.

225 EXAMPLE 4

An alternative to at least examples 1-3 comprises use of sound or speech as the controlling event, such as for people whose arthritis prevents them from holding remote controls and pressing buttons. There are a number of voice recognition systems.

Another alternative involves use of a touch surface as a pointing device.

230 Yet further alternatives may make use of a track ball, a cord that can be pulled, tilting of the head, or the like. Messages can most easily be created for sending by speech, optionally with a "webcam". The spoken word may be transmitted as such or converted into text as for an e-mail.

EXAMPLE 5

235 Little or substantially no hearing. Keypads (as for ordinary remote controls). Personal computer type controls. Palm computer control. Audible outputs of the set top box not

required, most probably. The set top box may include a "dictation reader" software package so that words spoken are displayed as text, and may also include or cater for facilities that either provide or emulate the various telephone-based systems (such as TTY) that allow hearing-impaired people to send messages by telephone. (Any specific interface should also be able to receive the increasingly popular text messages and display them). Messages can be created for sending by speech, possibly, optionally supplemented with a "webcam", by typing, or by writing with the scribe.

EXAMPLE 6

Stroke, head injury, multiple sclerosis, motor neurone disease, or similar motor disabilities. One possibility is the use of speech as the controlling event. Others are finger pressure, eyelids, jaw movement, etc., and possibly squeezing a rubber bulb to cause a manometer display to rise and fall on a screen. This option 200 is shown in Fig 2. The rubber bulb 201 also includes a nurse call button 202 and a pressure transducer within is connected by wire 203 (or infra-red link) to the STB, 105. The television-type display 102 is shown with a "manometer metaphor" 204 - currently reflecting squeeze pressure by rising to 205 This interface may be configured so that after a short period of squeezing the bulb at a more or less constant pressure, the choice such as 207 at the right of the guide line 206 is activated, and optionally acknowledged in an "are you sure?" mode. Where a choice leads to further choices, the row of dots 208 favoured for indicating further choices in computer menus may be used. No squeeze at all deactivates the menu screen and the system reverts to showing television, for example. The reader will appreciate that software gives a designer a considerable amount of freedom to create a complete interface using nothing more complex than a squeezable bulb.

More elaborate control means for severely disabled persons may involve a video camera scanning the individual's face, connected to image processing hardware capable of interpreting facial expressions or eye directions for example as controlling events. Messages can be created for sending with relatively more difficulty in this group by speech, optionally with a "webcam", by typing, or by writing with the scribe. They may be decoded into text characters. The sender may be pleased to have a caregiver edit the messages before they are transmitted.

EXAMPLE 7

Mental faculties impaired - eg Alzheimer's disease, dementia, head injury, etc. Very simple interfaces such as only "yes/no" choices (never multiple choices), uncomplicated questions, the machine may remember previous successful connections (and may rate more highly

those connections that were used for longer periods), and a care-giver may programme the invention to provide a set of entertainment events over a period, perhaps by setting the preferences to be offered or perhaps by specifically programming what will be delivered. How messages may be sent depends on the extent of the person's disability.

275

GENERAL PRINCIPLES.

Although we have done very little development as yet on the psychological and common-sense aspects of the invention, some general principles of any successful interface would appear to include:

- 280 1. Feedback to the user whenever an instruction is given.
2. Text information, if required, is made large enough to be read easily. A "text zoom" software routine or graphics card "magnifier" may be useful for those web sites that do not naturally use sufficiently large characters. That type of feature usually makes interface usage more complicated.
- 285 3. The hypertext method of selection provides one useful set of rules in the use of text for control purposes, at least for sighted people, because it is also used within the Internet.
4. Reliance on the well-developed spatial orientation of a human to re-locate icons or position on a menu by X-Y position.
5. Clear, simple presentation of choices, using "yes or no", rather than multiple choices and
290 provide for easy traversing of a menu back and forth.
6. We expect that a tree menu will be used in this invention, so that the user traverses various branches from the trunk outwards, until a desired selection is found. This menu can be one of the constants of the invention, regardless of interface. Ways to help a user become familiar with it include: constant architecture, use of colour, use of sound,
295 display of an overview or "location diagram", short cuts, and labelling nodes.
7. Alternatively a "column then row" structure could be used, like that of many computer applications. This also has a "constant architecture" feature so that the same thing lies in the same place. This approach requires better resolution / better eyesight and it may be preferable to employ a version capable of use by even the most disadvantaged persons.
- 300 8. Avoid giving the user the impression that "the machine is taking over". Possibly a "well-meaning puppy" metaphor could be employed to overcome user resistance.

9. A built-in learning ability, such as an ability of the invention to remember what the individual ...

(a) did the last time the interface was used (or used in this particular way)

305 (b) did the same time yesterday

(c) did the same time last week, (with reference to broadcast programmes) or

(d) usually does ...

and suggest that same action as a preferred choice.

10. The "learning" option can lead to a monitoring function. For example if the person stops
310 using the invention in their usual way, the cause may be an illness such as a transient
ischemic attack (TIA or mini-stroke). If the person is under the supervision of an agency
and lives alone, a change in behaviour could be signalled to the agency so that someone
calls and checks on the person in case an apparent change has a medical cause.

ACTUAL EMBODIMENTS

315 The set top box itself may comprise

(a) means to accept a range of communications inputs (some of which are also outputs)
such as a radio aerial, a TV aerial, a satellite TV cable, as per the list of "services to be
brought together" described previously as in Fig 1.

320 (b) Selector means capable of connecting any one input to a display device (such as a TV
set), and

(c) Control means (such as an embedded CPU with supporting hardware of up to about the
capability of a typical personal computer) capable of interacting with any one of a range of
described as well as any as yet undeveloped specific interfaces (see above).

325 Parts (a) and (b) are standard. Part (c) may be included into an existing device with
software. Each specific interface is likely to be provided together with a set of control
instructions embedded in digital memory, so that future developments in the interface area
can be acquired as they come to market, and used along with an existing set top box
according to the invention. The digital memory is included within the physical substance of
the interface, or within a small plugin module for insertion in a dedicated socket in the set
330 top box, or downloaded.

We prefer that wireless communications (RF (e.g. Bluetooth) or infra-red, for example) be used between the specific interface and the set top box, because in general we expect the interface to be attached to the individual user or his/her place of repose, and the set top box to be on the entertainment module (TV set or the like) and it is inconvenient to have physical wires running across a room. However, low cost requirements may prevail and a cable connection is used.

Looking further outward, the invention also covers at least some of the information presented to the user. For example, a web page provider may generate a number of web pages for which the presentation, degree of difficulty, and informational relevance is attuned to the kind of specific interface in use perhaps by including a specific identifier within the metatags attached to each page. For example a blind person's use of the Internet would be totally different to that of a deaf person, and an elderly person using a simplified-presentation interface may prefer to hear songs from their youth rather than songs that appeal to modern teenagers.

A search in Google.com using the terms geriatric and Internet carried out in March 2002 suggests that appropriate web sites are as yet not highly developed. There is likely to be an increasing amount of Internet information directed to the elderly at least because in the near future people who become old will already be used to relying on the Internet for information and/or entertainment.

A useful form of web page is one connected to a medical services provider, such as the general practice that the individual uses. Two-way communications (such as "home care coming tomorrow") may be provided for, and if a "webcam" is provided as part of the individual's installation, a nurse or doctor can check on the general appearance of each of their patients without the trouble of an actual visit. Related pages may be connected to pharmacy, ambulance, etc. A related web page may be connected to pastoral care from a minister of religion or the like.

Another useful form of web page is that of a relative's family. Access to this web page may be restricted to other members of the family so that more personal material can be loaded. Passwords may be loaded in to the individual's own set top box so that they need not be upgraded in the specific interface is exchanged. Movies and sound clips can be included. Using the webcam, two-way videophone calls can be arranged with any other Internet user. (Many elderly people lack visitors because often families move to other cities or other countries. The cost of transport is more likely to rise than to fall in the future).

VARIATIONS

365 A likely variation is that the individual user is, instead of a floor-standing television set,
provided with a small liquid crystal display (LCD) screen capable of displaying video and
sound as well. Fig 3 shows such an arrangement 300, clamped by clamp 306 onto a pipe 307
forming part of a bed, table, or free-standing support. Such screens may be embodied in a
palm computer, or provided as the about 14 inch LCD screen (302) that is becoming a
370 commodity item in the personal computer world. This kind of screen can also act as a touch
screen (patient hand 309) for controlling the interface. In this case, the STB (105, with
internal component board 105A) and the display module may be physically combined.
Bringing the specific interface unit, the display, and the STBs into the same physical unit is
highly convenient. For example, a "Geode" platform 105A includes two standard PCI bus
375 sockets. A computer graphics card 304 inserted in one of them can drive a computer-type
LCD screen 302 with television images, control text, Internet browser screens, and the like.
(This overcomes the relatively poor resolution of a standard PAL television set). This
drawing does not include a preferred protective case surrounding the interior modules.

However, a large number of original sources of entertainment, by each having a separate
380 input cable, may undo that single-unit convenience. One solution is to externally combine
the original channels of communication into a single broadband signal (such as a local
broad-band radio link picked up by aerial 310 or an optical signal carried in an optical fibre),
so that at most one conducting lead (plus mains power, 308) goes to the invention. This
variation may interest an advanced cable television provider. Such a business may gain
385 income in return for services by providing advertising appropriate to the market being
catered to.

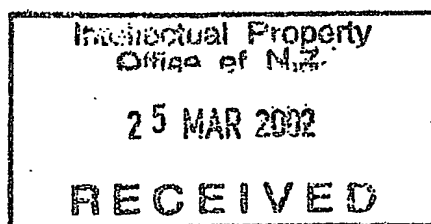
Particularly for the more extreme cases of disability, another person can load the set top box
with a sequence of instructions comprising a programme of entertainment, selected with the
help of a schedule of daily programmes from any of the sources available at the particular
390 set top box. This may be done by any person and it may be done by downloading the
sequence from another site. We assume that the STB includes a clock and timer. Often a
problem is that there is nobody available to turn the tape over, or to switch the television
on when a selected programme is starting.

An equivalent of a "toll bar" may be needed in some cases to control access to those
395 services which charge for use. Some service providers assume that all their customers have a
large, continuous income.

COMMERCIAL BENEFITS or ADVANTAGES

1. The invention allows individuals to interact with the world throughout their lives, even with advancing decrepitude caused by age, accident, or ill health.
- 400 2. The invention permits individuals to stay at home, managing their affairs, doing shopping, being able to call for medical aid, and communicating with friends and relatives, for longer than might otherwise be possible.
3. The invention makes a stay in a rest home more stimulating and should result in healthier, happier people. It also improves the possibility of bidirectional communication
405 with remote friends and relatives. Kids don't often write letters but they would send Granny a text message.
4. One problem with nursing homes is that there is rarely enough "spare nurse time" to change over an immobilised patient's radio, TV, or tapes as soon as the current event is finished. With this invention, a care-giver may programme the set top box through its
410 interface (or through another interface) to provide a set of entertainment events over a period, based for example of a list of radio and/or television programmes. This could be done over a remote link.

Finally, it will be understood that the scope of this invention as described and/or illustrated herein is not limited to the specified embodiments. Those of skill will appreciate that
415 various modifications, additions, known equivalents, and substitutions are possible without departing from the scope and spirit of the invention as set forth.



Ensor and Associates

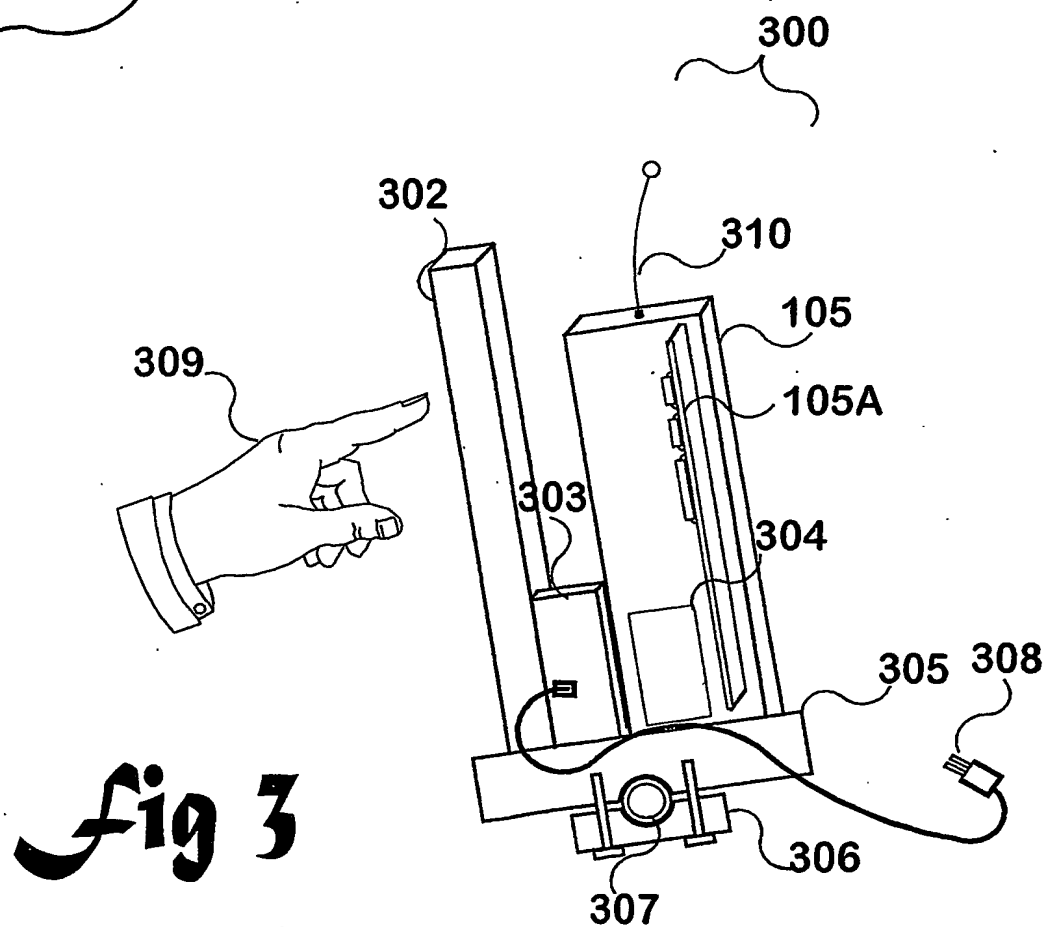
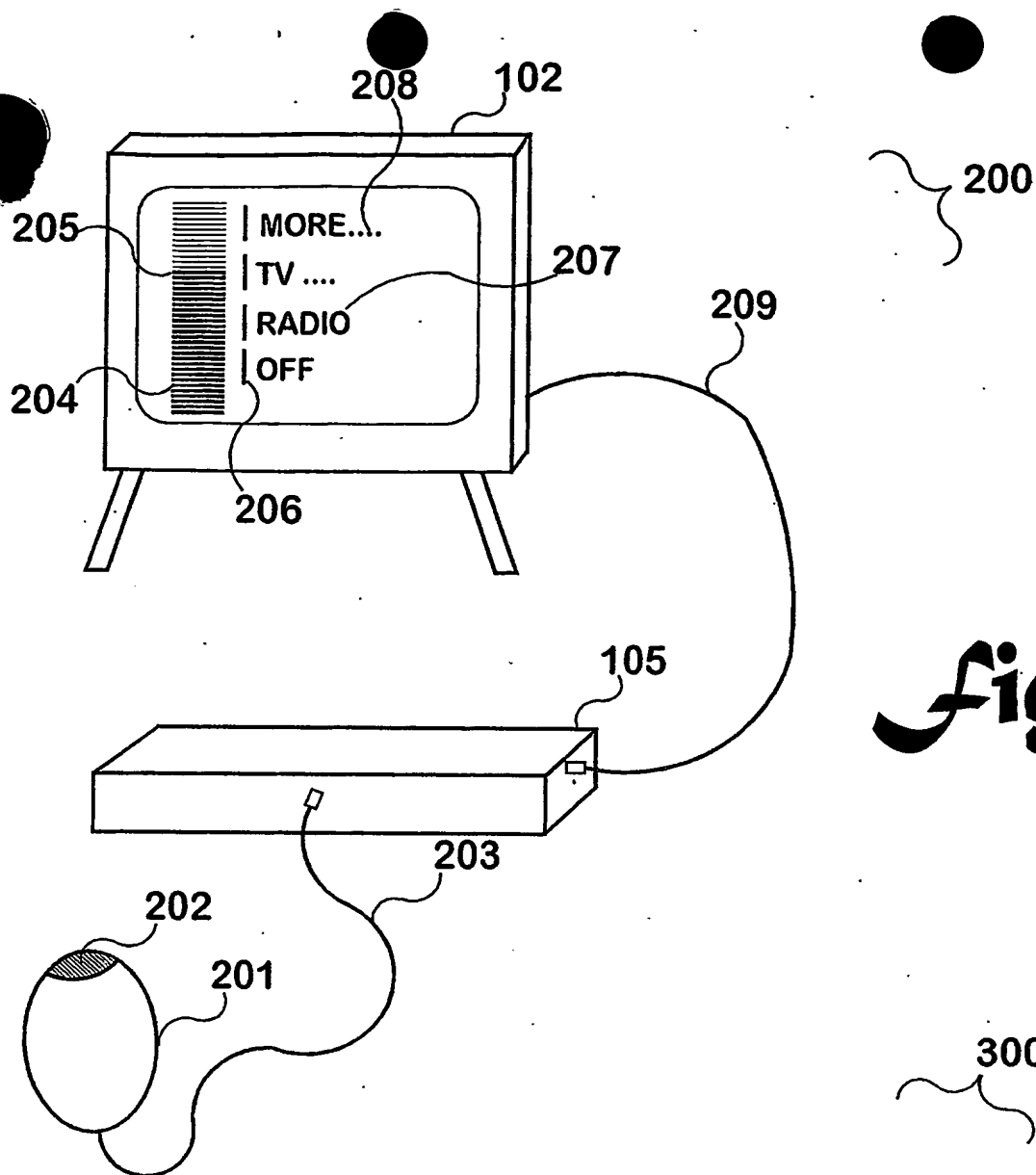
for

David Michael King

A handwritten signature in cursive script, appearing to read "David Michael King", followed by a horizontal line.

ABSTRACT

The invention helps a range of less technologically able (or inclined) persons (even quite severely handicapped persons) keep in touch with the outside world using interactive television, computer communications, and the like using a set-top box or similar; and a television display. A range of disability-matched
425 interface devices are provided for controlling the set-top box. Consistent decision trees across the range, storage and re-use of user preferences, and opportunities for medical alerts are provided for.



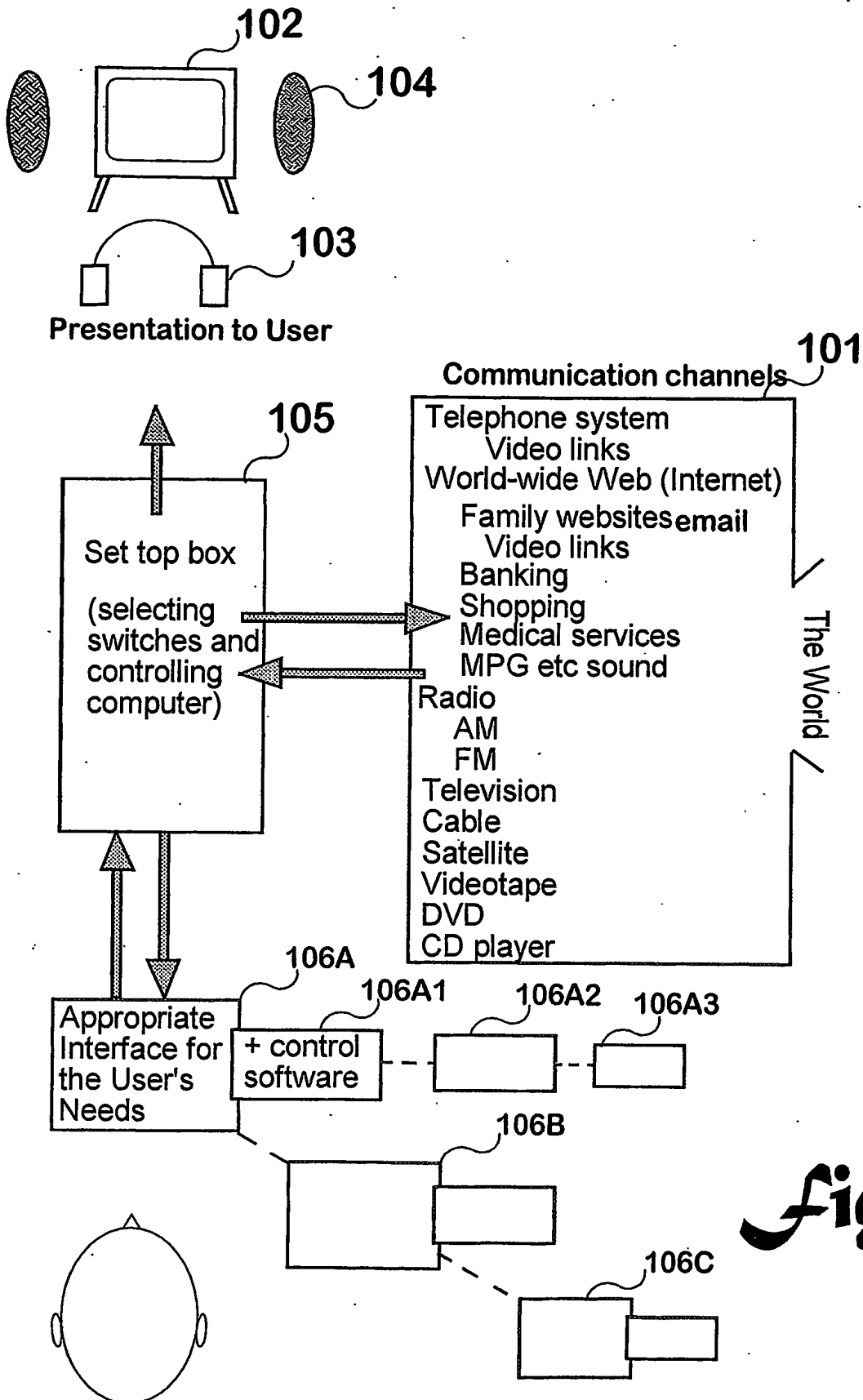


Fig 1